

Thermal Anomalies – Fires & Biomass Burning

Product Description

The product includes fire occurrence (day/night), fire location the logical criteria used for the fire selection and an energy calculation for each fire. The product also includes composite 16 day and night fire occurrence (full resolution), composite monthly day and night fire occurrence (full resolution), gridded 10-km summary per fire class (daily/ten day/monthly), gridded 0.5° summary of fire counts per class (daily/ten-day/monthly). The Level 2 product includes various fire-related parameters including the occurrence of day and nighttime thermal anomalies which will be flagged and grouped into different temperature classes with emitted energy from the fire. These parameters are retrieved daily at 1-km resolution. The fire product uses the special fire channel at 3.9 μm that saturates at 500K and the high-saturation level of the 11- μm channel. During the night, the fire product will also use the 1.65- and 2.15- μm channels. In the early post-launch period the product will include the smoldering/flaming ratio per fire class and an estimate of the area burned.

Research & Applications

Fire is an important process within a significant number of terrestrial biomes, and the release of gases and particulate matter during biomass burning is an important contributor to the chemical reactions and physical processes taking place in the atmosphere. Fire is a significant and continuous factor in the ecology of savannas, boreal forests, and tundra, and plays a central role in deforestation. Fire information will be used to drive regional emissions models, trace gas transport models, and mesoscale models of atmospheric chemistry. Important impacts of fires include

- changes of physical state of vegetation and release of greenhouse gases;
- release of chemically-reactive gases during biomass burning;
- release of soot and other particulate matter during fires;
- changes in the exchange of energy and water between land surfaces and the atmosphere; and

- changes in plant community development and soil nutrient, temperature, and moisture.
- cloud development and reflectivity

Data Set Evolution

The MODIS fire products build and improve upon the experience of fire assessment primarily using the NOAA AVHRR and GOES systems. Currently, no one sensing system provides the instrument characteristics needed for an effective global fire monitoring program. The MODIS sensor has been designed to include characteristics specifically for fire detection and will provide a unique capability over existing sensors in terms of fire monitoring. The location accuracy and improved instrument characterization and calibration will enable unprecedented fire monitoring data sets. Attention should be given to the overpass time (10:30 a.m. for the AM-1 platform) for fire detection with respect to the diurnal cycle of fire activity. MODIS will also offer unique spatial and radiometric capabilities for burn scar detection; automatic procedures for burn

MOD 14, MOD 40 PRODUCT SUMMARY

Coverage:

global, daytime/nighttime

Spatial/Temporal Characteristics:

1 km, 10 km, 0.5°

Key Geophysical Parameters:

fire occurrence and class, fire selection criteria, fire location, smoldering and flaming ratio, burned area

Processing Level:

2, 3

Product Type:

standard, at-launch and post-launch

Science Team Contact:

Y. Kaufman, C. Justice

Thermal Anomalies – Fires & Biomass Burning

scar detection are under development as a post-launch product.

Suggested Reading

Andreae, M.O., *et al.*, 1994.

Global Biomass Burning. J.S. Levine, Ed., 1991.

Justice C.O., *et al.*, 1993.

Kaufman, Y.J., *et al.*, 1990b.

Penner, J.E., *et al.*, 1992.

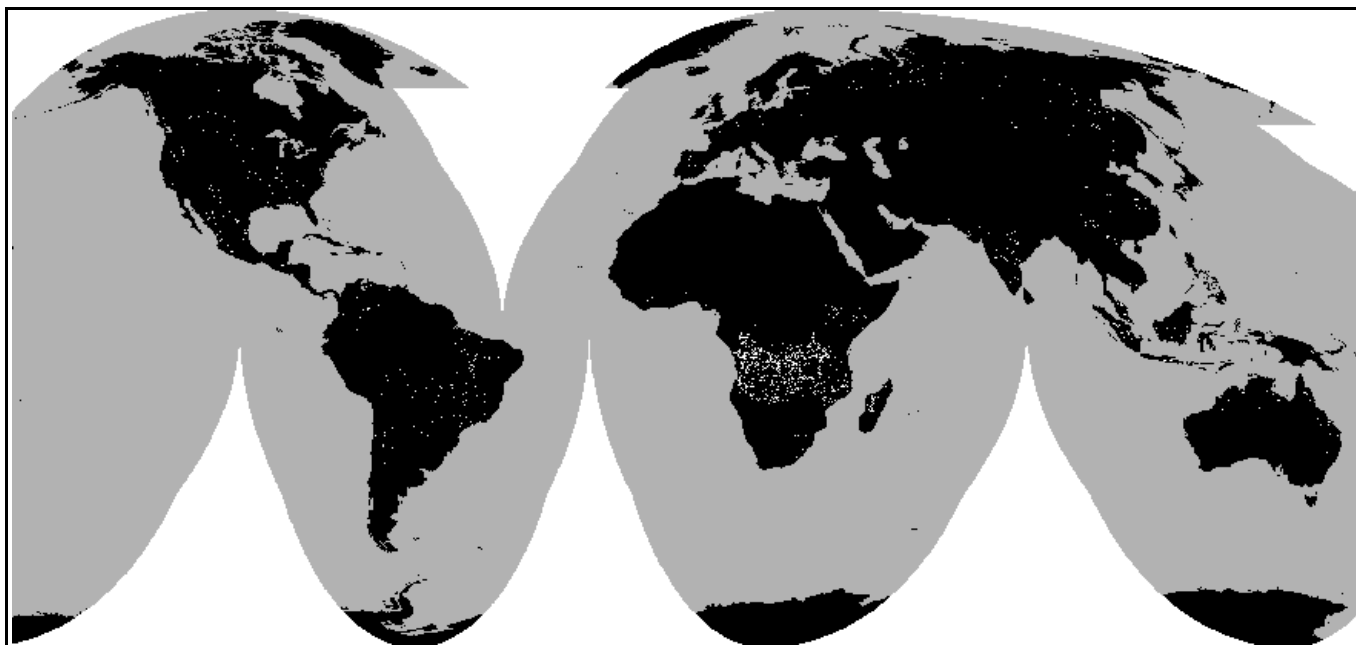


Figure 30. NOAA/AVHRR Detected High Temperature Sources: June 25, 1992. Derived from the IGBP-DIS Global 1-km set provided by USGS Eros Data Center.